

REMARKS

In response to the Office Action dated October 4, 2005, Applicants respectfully request reconsideration. To further the prosecution of the present application, each of the rejections has been carefully considered and is addressed below. The claims as pending are believed to be in condition for allowance.

It is respectfully asserted that the cited sections of the prior art relied upon to reject the claims does not teach anything at all related to the aspects of the present invention Applicants are seeking to protect, such that there appear to be significant differences in the manners in which Applicants and the Examiner are interpreting the claims. Therefore, if after reviewing the comments below the Examiner continues to believe that the rejections remain valid, she is requested to contact the undersigned at the number listed below to discuss the manner in which the Examiner is interpreting the claims to read upon the cited prior art, so that progress can hopefully be made in moving the application forward.

Overview of Embodiments of the Invention

One embodiment of the invention is directed to a method and apparatus for mirroring and restoring data (specification, page 1, line 5). The copying of data in real time from one storage area to another is referred to as mirroring data (page 2, lines 6-7). A mirror is created by synchronizing it to a source or standard storage area, so that updates to the standard storage area are also performed to the mirror (page 2, lines 21-24). A mirror that is synchronized to the standard storage area is said to be in a mirrored state, whereas a mirror that is no longer synchronized is said to be in a split state (page 2, lines 24-26). A mirrored storage area in a split state can be considered a snap shot of the standard storage area at a particular point in time (page 3, lines 1-5).

If a standard storage area becomes corrupted, the data may be restored from a mirror in a split state (page 8, lines 4-6). In conventional systems, a restore operation that restores data to the standard storage area from the mirror typically involves not only copying information from the mirror to the standard storage area, but also a resynchronization so that any updates to the standard storage area during the restore operation are passed to the mirror (page 8, lines 6-9). Applicants appreciated that if a corrupting write were made to the standard storage area during

the restore operation, the corrupting write would be performed to the mirror as well, so that the ability to recover uncorrupted data may be lost (page 8, lines 10-12).

In accordance with one embodiment of the invention, while a restore operation is performed from a mirror to a standard storage area, updates to the standard storage area are **not** passed to the mirror, so that the integrity of the mirror is retained (page 8, lines 13-15). This differs from conventional restore operations from a mirror.

The foregoing summary is provided merely to assist the Examiner in appreciating various aspects of the present invention. All of the discussion above may not apply to each of the independent claims, and the language of the independent claims may differ in material respects from the discussion provided above. Thus, the Examiner is respectfully requested to give careful consideration to the language of each of the independent claims and to address each on its own merits, without relying on the summary provided above. In this respect, Applicants do not rely on the summary provided above to distinguish any of the claims of the present application over the prior art, but rather, rely only upon the arguments presented below relating to each specific independent claim.

Rejections Under 35 U.S.C. §102

Claims 1-36 are rejected under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent No. 6,397,307 ("Ohran"). This rejection is respectfully traversed.

Claims 1-13

Claim 1 is directed to a method for mirroring data of a first storage area. The method comprises: placing a second storage area in a first state, wherein the first state of the second storage area is a state in which updates to the first storage area are made to the second storage area; mirroring data from the first storage area to the second storage area while the second storage area is in the first state; changing a state of the second storage area from the first state to a second state in which updates to the first storage area are not made to the second storage area; and restoring data to the first storage area from the second storage area while maintaining the second storage area in the second state.

While Ohran is directed generally to mirroring and archiving mass storage (abstract), Ohran simply does not teach restoring data to a first storage area from a second storage area in the manner recited in claim 1. Specifically, Ohran does not teach mirroring data to a second storage area, changing a state of the second storage area so that updates to the first are not made thereto, and then restoring data to the first storage area while maintaining the second storage area in the state wherein updates to the first storage area are not made thereto. This distinguishes over conventional systems, wherein a restore from a mirror typically involves a resynchronization so that any updates to the standard area are passed to the mirror (specification, page 8, lines 6-9).

The Office Action asserts that restoring data to a first storage area from a second storage area while maintaining the second storage area in a second state (in which updates to the first storage area are not made to the second storage area) is taught by Ohran in three places, namely col. 8, lines 15-26, col. 10, lines 21-44, and col. 12, lines 11-23. Applicants disagree.

The section at col. 8, lines 15-26 discloses the protection of data through the use of a duplicate version. (col. 8, lines 15-16). The duplicate version can include duplicated historical data, referred to as archived data, or duplicated current data, referred to as mirrored data (col. 8, lines 16-21). The duplicate storage is referred to as the secondary storage and the storage being protected is referred to as the primary storage. (col. 8, lines 23-27). This section says nothing about restoring data to the primary storage from the secondary storage.

The section at col. 10, lines 21-44 relates to a description of the types of storage devices that can be used for the secondary storage. This section also is completely silent as to restoring data to the primary storage from the secondary storage.

The section at col. 12, lines 11-23 characterizes the method of Fig. 2 as maintaining the secondary storage in a current state with respect to the primary storage by capturing logically consistent states, to ensure useable data is always available from the secondary storage. In this respect, Ohran describes logically consistent data as having no logical inconsistencies, such as data files that are corrupt or terminated improperly. (col. 1, lines 47-50). This section is devoted exclusively to describing the transferring of data to the secondary storage, and also is completely silent as to restoring data to primary storage.

As should be appreciated from the foregoing, the cited sections of Ohran do not discuss restoring data from the secondary storage to the primary storage at all, and thus necessarily do

not describe the novel method recited in claim 1 of restoring data to a first storage area from a second storage area to which data previously was mirrored, but while maintaining the second storage area in a state wherein updates to the first storage area are not made to the second storage area. Therefore, it is respectfully asserted that the rejection of claim 1 as purportedly being anticipated by Ohran is improper and should be withdrawn.

Claims 2-13 depend from claim 1 and are patentable for at least the same reasons.

Claims 14-23

Claim 14 is directed to a storage system that comprises a first storage area, a second storage area, and at least one controller. The controller places the second storage area in a first state, wherein the first state of the second storage area is a state in which updates to the first storage area are made to the second storage area; mirrors data from the first storage area to the second storage area while the second storage area is in the first state; changes a state of the second storage area from the first state to a second state in which updates to the first storage area are not made to the second storage area; and restores data to the first storage area from the second storage area while maintaining the second storage area in the second state.

As should be appreciated from the foregoing, Ohran does not teach or suggest at least one controller that restores data to a first storage area from a second storage area while maintaining the second storage area in a second state (in which updates to the first storage area are not made to the second storage area), as recited in claim 14. Therefore, it is respectfully asserted that claim 14 patentably distinguishes over Ohran, such that the rejection of claim 14 under §102 as purportedly being anticipated by Ohran should be withdrawn.

Claims 15-23 depend from claim 14 and are patentable for at least the same reasons.

Claims 24-36

Claim 24 is directed to a computer readable medium encoded with a computer program that, when executed, performs a method similar to that recited in claim 1. Therefore, for reasons similar to those discussed above in connection with claim 1, it is respectfully asserted that claim 24 patentably distinguishes over Ohran, such that the rejection of claim 24 under §102 as purportedly being anticipated by Ohran should be withdrawn.

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Claims 25-36 depend from claim 14 and are patentable for at least the same reasons.


CONCLUSION

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, she is requested to call the Applicants' attorney at the telephone number listed below to discuss any outstanding issues relating to the allowability of the application.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicants hereby request any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

Respectfully submitted,
Madhav Mutalik et al., Applicants

By:



Richard F. Giunta, Reg. No. 36,149
Wolf, Greenfield & Sacks, P.C.
600 Atlantic Avenue
Boston, Massachusetts 02210-2206
Telephone: (617) 646-8000

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